Summer Convocation
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SCIENCE AND SOCIETY

Mr. President
Members of the Graduating Class
Ladies and Gentlemen:

In 1927 the Bishop of Ripon in preaching to the British Association for the Advancement of Science lamented that scientific advances seemed to be submerging us in a manner of living which was destroying the finer things of life; that civilization was gradually disappearing in a quicksand of materialism. He suggested that a moratorium be declared on science for a period of years so that society might "catch up with itself". These and similar views have repeatedly been expressed by reasonable and intelligent people and, therefore, warrant our critical study. Such sentiments are by no means the outcome of the jazz age, or even of the gay nineties. At intervals in modern times it has been said that "Now we have enough of material improvements; nothing important is lacking. Let science take a holiday!". In eighteen hundred and forty-four, almost a hundred years ago, the United States Commissioner of Patents intimated that the advancement of the Arts from year to year presaged the arrival of the time when such improvement must end! Such distinguished precedents of some present day thinking are mentioned, not with the intention of minimizing the seriousness of the problems we face in the impacts of science on society, but to show that they are not new. My purpose is to offer a different solution from that of the moratorium or "science holiday".

The material existence of the so-called civilized, or enlightened, or advanced nations is so bound up with mechanical art (the use of power) that we must adjust our thinking to the fundamental changes which have come about in the relationship of what man can do today with a machine in contrast to what he did yesterday by muscular exertion. One-hundred and seventy-three years ago Watt's improvement of the Newcomen engine started the world on the most fundamental change in all of its material history; we cannot yet grasp the significance of this conquest of power - much less adjust ourselves fully to its consequences - and yet we take it for granted. Silas Bent in his book "Machine Made Man" published in 1929, names eighteen epoch-making inventions, starting with Cartwright's machine loom in 1785, down to Haynes' automobile in 1892. The list embraces the paper-making machine, the mowing machine, coal gas, photography, the locomotive, telegraph and telephone, incandescent lamps and others as indispensable.

We could spend an intriguing half-hour or so in merely speculating as to what any one of these numerous inventions has meant in our life today, by subtracting it and all of its subsequent developments from our usage. Try to picture what society would have failed to enjoy in the past 150 years, compelled to get along with hand-woven textiles or without the sewing machine; or try to picture the state of development which we would <u>not</u> have reached in national expansion, during

the last hundred years, without the locomotive - and remember Bent's list ends in such a dim past that the airplane and the radio are not even mentioned. Could we but turn back the clock of time and by some omnipotence erase all the magic of the last hundred years of man's material creations, would the world be a better place and - most importantly - would man be a finer being? Well may we doubt it.

In the first place, what circumstances have seemed to justify the pleas for relief from too much science and too much technology? From what apparent disadvantages is society suffering at the hands of science? The revolt against science has embraced two general counts: first, the material side which is connected with such phenomena as unemployment and other depression ills, and second, the supposed lowering of our moral tone because of our materialism.

The most serious charge in the first indictment, namely that of unemployment created by the machine, is difficult to meet because of its apparent truthfulness. The present occasion does not permit the discussion of what is wrongly termed "technological unemployment", nor does the speaker know of anyone who has the final answer on this moot subject. Statistics show that the most highly mechanized industries have a higher degree of total employment (counting in the collateral fields) than those less mechanized. As an example,

it is known that there is 25 per cent more labor, or man-hours, going into the manufacture of the present automobile than were required to make the car of 1913. Twenty-five years ago we thought the late model 1913 was a pretty satisfactory piece of mechanism but, as Mr. Kettering has pointed out, that model, even though preserved in a vacuum, would not sell today. This is a good example of the fact that the satisfying of one wish for perfection seemingly begets desires for greater performance in other respects until it would seem that our wants are insatiable. Indeed, one recent definition of "a higher standard of living" is "having those things one is unhappy without".

On the other hand, one may say that the consensus of economic and engineering thought today is that the machine does cause a dislocation of employment and that at this moment society has not learned to accommodate this dislocated section of workers during the periods of translation. This problem demands the instant study of our best thinkers in economics, sociology, engineering and statesmanship. To delay its solution endangers all that civilization has won in a considerably longer time that the two hundred years since the start of the power age. May we not agree that one hopeful sign is the awakening of that practical scientist - the engineer - to the need for his cooperation in this study. Until now he has been curiously aloof - not reluctant - but

characteristically modest with his views, if perchance he has had any to offer on the social effects of his creations. Patently fallible, yet the engineering approach of detached critical analysis may offer advantages over those advanced at times from other sources. But even with the obvious dislocation of labor, the good following the use of labor-saving devices has so far outweighed the evil as to warrant the belief that further developments will be beneficial rather than harmful if the standard of living for all is to be improved.

So many of us seem to think that our machines must be stilled because of over-production, whereas the fault is lack of distribution. And this brings me to the crux of my thesis: The lack of distribution facilities is a <u>human</u> failure - not a shortcoming of the machine. It would seem to one unlearned in economics, that the engineer has increased the efficiency of production of goods and the utilization of power, but that the merchant and the capitalist have fallen sadly behind in the distribution of these goods. Probably no one present would deny (if he or she could) to a single one of our 135 millions, any one of the luxuries we each enjoy to a greater or less degree. No one here would withhold from any one of these millions, sufficient food, medical care, comfortable and sanitary surroundings and a reasonable share of leisure. Yet how can these simple rewards be furnished in adequate

quantity without the assistance of the machine?

Some think that there is an inherent incompatibility between the machine and mankind in the aggregate; a kind of cosmic feud in which the machine, in some insensate way, will finally annihilate us. They would have us put away the mechanisms upon which we rely. They would have us believe that we will be relieved from present ills by a return to the simplicity of the handicrafts. Just to what degree mass production would be eliminated has never been made clear. Banish the machines and give us a picture of halcyon bliss with working hours from daylight till dark! Or maybe some commodities will still flow from the production line and others from craftsman - no small problem in itself.

What of the second count of the indictment, the more or less intangible effects resulting from the impact of science on our spiritual welfare? That these impacts of modern life are real, there is no doubt. That they can be laid at the door of science is highly debatable. Arguments, however, are possible that science has advanced our tempo so that we say we have less time for the proper development of our higher natures - less time for contemplation and enjoyment of cultural activities. Do we not look in vain for a higher type of spiritual development among the citizens of, say, the Golden Age in Greek civilization? Excepting the great philosophers - and occasional individuals in the leisure class - it seems doubtful if the men, women and

children of Athens or Sparta were substantially more spiritual than our neighbors in Cincinnati or Worthington. Certainly the hordes of Attila were not less materialistic than a cross-section of this community today. Science, some say, is responsible for the attendant ills of urban life. But even as a small boy I used to wonder if Babylon could have been such a fine city in which to have lived. Or, if we credit the Hollywood historians, how about Chicago before the fire?

And so we might proceed, long after the time available, each naming his pet peeve, petulantly listing the radio, the airplane, the automobile, the telephone, the automatic refrigerator, stainless steel, the stock ticker, and so through a phantasmagoria of those items by which we gadget our way through life. Some worthy souls are confused by the rapid fire tempo of everyday life and they pay with the neuroses which fill our sanatoria. Is this the unavoidable price exacted by our technical progress? It is not; the sociologist and the alienist agree that mental ills spring from man-made deficiencies.

Does it not seem futile to try to hold science in leash? Could it possibly be done? Let us be practical: Assume this very group to be charged with the responsibility of decision - now and here. First we would decide on a time to stop all advancing into the frontiers of the unknown. Obviously we cannot exempt any branch of human endeavor - medical or otherwise - because each is so interrelated with all the

others. Medicine depends on chemistry and physics, and each in turn upon mathematics - and so on. Agreed then; we will stop all.

The time? One might say the moratorium should have started in 1910 because that would have made the world war less ghastly since we might have been spared poison gases, tanks, Zeppelins and so on. Common sense tells us otherwise, because it has been shown that the deadliest weapon in human history, as measured by losses in battle compared with number engaged in battle, was the Roman broadsword. But let no one read into this statement a plea for bigger and better wars; the economic costs of modern warfare are so staggering and their sequalae so terrible and far-reaching, that one might almost say that the man who falls in battle gets a real break! How about 1920? And a mighty army of useful citizenry would remind us that not yet had Banting discovered insulin. End all argument then and say - "Now, today". Even as we are gathered here,somewhere a cure for cancer may be found. To stop such progress would not only be futile - it would be a crime against the society we would protect.

What then may one suggest as a surcease from the constant wear and tear of the material on man's soul? Must you be denied your symphony concert if I let my loud speaker bray all night? Must your afternoon in the country be denied if I try to mix alcohol and motor fuel? Never does the automobile -

from a statistical point of view one of our most deadly mechanisms - go berserk and sneak into our apartment and strangle us as we sleep! The refrigerator that cools that gastronomic monstrosity, the cocktail, also keeps the baby's milk sweet and pure!

So why not face the facts. If we go to war on defenseless populations - what has science to do with that? The fault is yours and mine. If our nerves are shattered by the noise of the elevated - let science weld the rail-joints and float the mechanisms on rubber. If we do not, the fault is mine and yours. Rather than delay science one moment, let us urge society to catch up with it.

To the graduating class: Upon you there lies a special responsibility. Help those to whom you are about to dedicate your life (for to you all there is a dedication to human service). Help those who will look to you - because of the advantages you have had - to know and to separate the true from the false; to use the good in the best way. Particularly do you teachers help the youth to revere and to foster science for the joy and growth of humanity. Rely on science tempered with a love of fellowman. Stamp out that spurious notion of a conflict between true science and true religion. Help to ennoble and not degrade the uses of science to a better life of the future. These are a part of the responsibilities which - because of your graduation - will

rest upon you always. And sharing this responsibility with you teachers are the doctors, the lawyers, the business men and the engineers. Let us not be frustrated by the increasing complexities of our modern existence.

We must go <u>on</u> - that is LIFE.